Notebook, N-89-05-30.2

This notebook covers the periods May-August 1889 and October 1895-February 1896. There is also one dated entry from February 1898. The first 57 pages (not filmed) were used by Jonas W. Aylsworth as a rough record book for phonograph cylinder experiments, nos. 1-28. On page 15 is an entry by Edison from May 30, 1889 entitled "first class cylinder." Transcriptions of these records can be found in N-88-08-23 (experiments, nos. 1016-1065). The remainder of the book was used by an unidentified experimenter for notes on cylinder experiments, nos. 30-110. The front cover is labeled "Book 1000." Another inscription indicates that the book was used as an exhibit in *American Graphophone Co.* v. *National Phonograph Co.*, United States Circuit Court, District of New Jersey. The book contains 189 numbered pages.

Blank pages not filmed: 166-177, 184-187.

No 3½

May 30 – 1889

(13)

1022

First class cylinder –

Not ½ scratch of Rag – make a splendid musical cylds – Very hard. will probably require Saphire Cutters, Cant be filtered well – Moulds nicely – only keenest Edges on Records Can be used on account hardness – Can track deep. works well as a Thick or thin Veneer low melting point, pours low temperature. The Cylinder I tried was filtered –

500 grammes Purified Cake Beeswax
470 grammes Carnauba
30 " dry Salt acetate Alumina

Cook well to get off acetic
Color light brick red – The end
a great lot of pineapple
alumina left, This Cannot filter to work on

Oct 17/95 (59)

Investigation of the cause of black specks in wax & the wax coming dark.

It was observed that the silver lined kettles became black.

Tests of the different materials showed that it comes from sulphur in the cocoa.

This comes from the natural cocoa, it sometimes is found in nature ~~[illegible]~~ in contact with a large of sulphur two or three times their bulk.

This sulphur is completely removed by heating to 400° with coffee turnings.

Improvement in method of making ore to get rid of the precipitated stearate of al which is a source of much dirt & much matter such as sulphate of soda & alum which does not dissolve in the water.

Tried to dissolve Al in acetic acid.
no go.

Tried to dissolve al in $KaHO_3 + Aq$.
Dissolved readily.

Wax a low new method.

Crystal carbonate soda 29.08
dissolved in 3 times its weight
of water to this is added,
after the solution gets to
almost boiling, 128 parts
of Aluminium powder
(from Pfleiming bid in Co)
When this is all dissolved
the solution is filtered hot
& quickly.
$Al_2O_3 + aq$ will separate out
when cold the solution can
now be conc — & there will
be nearly to fill in the stearic
acid.
above is enough for 100 of stearic

Rubber wax 1/4 kerosene

#31

Rubber wax vaseline with benzene

#32

Rubber wax vaseline with benzene oil added -

990 (200
900 123.7
7900
6900
9100
8400
700

900 (20
90 40

123.7
7
865.9

2000 (900
1210 2.2
2000

2.2 900 (20
200 10 45
1700 100
100

141 (200
140 20.1
100

Improved new Method of making Wax, Oct 19/95

E37

25.57	$NaCO_3 + 10 aq.$	dissolved & heated to boiling (nearly)
1.00	$NaHO$	
40.00	H_2O	

.28 fine powd'd alt added to above sol.

45% of this sol added to 100 gm stearine

20.1 gm cerasine

This will yield 123.7

If 1 gr. of soda sol should be 1,200 at 64° F

Mixt made on large scale (600 lbs)

This wax came crystalline & some stearate of alt was added which made O.K

25.5
153.0

Pg 69
but See Pg 63

First use of Aluminum in initial mixing of wax

#34 Oct 22/95

(69)

100 stearin

25.5 $NaCO_3 + 10\,aq$

1.0 Na HO

30 H_2O

.20 Al. found

Made in porcelain dish + a strip of lead foil 4 x 6" was immersed with top sticking out -

Sol. was added at 240° to 280

when ~~sold~~ solution and dried

temp run to 380°F and

10 parts crasine added (pure)

Wax foamed off to 440°F

when finished allowed to cool in same dish as it was made in.

Skin formed on surface at 324°F.

#35

100 alumina.

25.5 $NaCO_3 + 10 aq.$

1.00 NaHO.

30 K_2O

.33 Al found

Made same as #34 except
Fromed off for a longer time at 400°-420°
Cooled in same dish as it was made in.
Skin formed on surface at 330°F

36

100 stearin.
35.5 Na_2CO_3 + 10 aq.
1.00 NaHO
30 H_2O
140 al (found)
Dry cooked same as No 84
Congealing point 316 F.

37

Some liquid Reg. cooled same as # 34

Bonpoaling point = 288° F

92 (4)
23

38 Oct 2.4/9,-

(77)

Wax made in lead kettle at Silver Lake

400 lb. stearic
92 " $NaBO_3(10H_2O)$
1359 gm. NaHO
598 " Al (powd)
120 lb. H_2O
30 lb. ceresine

Wax was quite light color but was darkened some from burnt wax oozing out of tack holes in lead when the seam was made.

Congealing point = 262° F

39

Same as # 38 taken out before ceresine was added

40.

Hardening wax.

700 gm # 39

14 " linseed oil, (boiled?)

41

Hardening Wax

700 gm # 39.

40 " Raw Linseed (heated + filtered)

23
8
184

30
7
240

3
100

Variation of Reg. Oct 25 (81)

.142

100 Stannin
23 $Na\,BO_3 + 10\,Aq$
.75 $Na\,HO$
30 H_2O
.40 Al formed

No cassiri.

Stannin & Solution were double filtered.

Cooled in the dish it was made in no crystalline state at all
Very hard wax; good cut.

20	.75	.50
8	8	8
160	6.00	4.00

20
3
240

#43

100 atomic.

23 $Na_2CO_3 + 10\,aq.$

.75 $NaHO$,

.50 Al foil

30 H_2O

100 cocoanut

Stearic & Solution were double filtered.

#44

no alcohol
24 $NaHCO_3$ + iong
.171 ~~H_2O~~ ~~at found~~
.32 at found
no cocaine

130
9
1170
234
22
266

8
3½
4
24
28

#45 — 10/28/95 (87)

350 gms #42
21 " Thin paraffine oil.)

Congealing point = 130°C.
266°F

Hardness.

#46
350 gms - #42
28 " - Filtered raw linseed

#47 10/29/75 (89)

Made at Silverlake

100 Stiene
18½ $NaCO_3$ + 10 gg.
11.5 NaHO
30 H_2O
35 al
10.6 Benzene

#47½

Made at Silverlake 11/5/75

100 Stiene
23 $NaCO_3 \cdot 10H_2O$
19 NaHO
31 H_2O
35 al
21 Ben

122
9
1098
119
22
2571

125
9
1125
225
32
257

4×3
9

23
2
23

.75
9
675

#48 10/30/95

made in an Aluminium Kettle -
Wt of Kettle before = 336.75 [illegible]
" " " after 10 hrs = the same.

Steam and	100	× 9	=	900
Na_2CO_3 10 aq	23	× 9	=	207
Na_2HO.	.75	× 9	=	6.75
K_2O	30.	× 9	=	270
al —	.40	× 9	=	3.6

no amorphous.

congealing point = 257° F

#79.

Moisture test.
A lot of different cylinders among which were some regulars and #40 - 41 - 45 & 46 were put in box heated to 110°F with two samples in box over which was a pan containing water soaked moss.

Put cylinders in 9.00 am 10/30/95.
Two offered offset at 8.00 am - 10/31/95.
Graphone cylinder put in 9.00 am. 10/31/95.

at 8 AM. 11/4/95.
Reg wax was unaffected.
#41 very dull, #42 also dull.
#45 slightly affected #46 very dull.
Graphone not affected.

15
10

#50 11/4/75 (95)

400 gem. # 48
60 " Jahlend now linseed.

51 11/4/95 - (97)

400 gm. # 48
32 " byhindin oil.

#52 11/4/95

Test of aluminium bottle.

100 atomic
23 $NaClO_3$ liq.
1 NaHO. (pure made) } × 10
40 al.
35 H_2O.

Started adding solution at 130°c frained off to 195°c.
Turbidity began to come at 170°c & when finished it was almost perfectly clear. Very light color. Congeals at 123°c or 253°F

#53

Same as above made in porcelain dish. The solution was all made together & divided into two equal parts.
Made same as #52.
Turbidity was noticed about same as #52 & left about the same.
Very light congeals at 123½°c or 254.3°F

23
30
460

460
20
8
700

35
30
700

123
2
1107
2213.4
22
2235.4

1235
9
1111.5
2223
22
2543

My conclusion from observations of #52 & 53 is that aluminium (cast) bottle is O.K. without any doubt.

#54

350 gm #53 + 52 mixed
24½" cylinder oil.

#55

350 gm #52 & 53
17½ " crosine.
140 " cylinder oil.

#56

350 gm #52 & 57.
73½ " crosine.

57

350 gm. # 52 & 53

~~28 #~~ 28 " vaseline

58

Moisture test on # 52 - 54 - 55 - 56 & 57

Put cylinders in box Sat A.M. - box kept at 110° F. till 12

then from 5 to 12 Sat night

then from 5 P.M. Sunday to 8 A.M. Monday morning

All were affected so that they were not shiny but # 52 was the least affected.

#59 11/11/95 108

Moisture test.

#52 - 54 - 55 - 56 & 57.
the same cylinders as were
used in #58. were turned
off & put in box again
also #1 regular (see #38)
(box been made about two weeks)

#2 Regular (see #47)
(box been made about 1 week.)

#3 Regular - (see #47½)
(cylinders fresh molded 11/11/95 - a.m.
#60

#60 11/11/95

(107)

350 gm #152

24½ " Rosin oil.

$1300 : 90 = 2800 : x$

```
    90
252000   (1300
1300      190
12200
11700
  5000     210
```

#70 11/15/95 (109)

Oil for molding

1300 gm paraffin oil :
90 " stearic oil,
sealed with oil bag.

100

5000 [illegible]

[illegible]

2.5

New Solution. 11/15/91 (111)

#71

50 gm NaHO

38 " Al shot.

400 cc H_2O
stock of Fenousin.

All dissolved completely.

Solution filtered out light.

[illegible] 3

Did not separate out after standing 3 days (or 5 days)

6.5 cc = quantity for 100 stroms

2300 : 2170 = 100 : x

1200
2600
13
15%

217000 | 2300
20700 | 94
10000
9200
8000

11/12/95 (113)

Manufacture of Stearic Acid.

2300 gms beef tallow.
Melted down & strained.

yield of pure tallow = 2170
" " " " = 94 1/4 %

1000 gms of above saponified with NaHO,
Dissolved & precipitated with H.Cl.
~~15~~ 7% NaHO, = 130 gms
Wt of fatty acids 994 gms.

~~39~~

1500 gm tallow,

150 " NaHO in 500 cc H_2O.

NaHO added while tallow is very hot about 350° F.

In order to get all NaHO in wood last time fusion allowed to run 4 600 cc H_2O added. Mass fusion finished by HCl.

Fatty acids produced =

#75 11/19/95

(115)

570 chloride sulphur added to Olive oil cold - stirred well then heated to drive off HCl. & when it began to color, saponified with NaHO solution. Result an oily oil containing both chlorine & sulphur.

76. 11/19/95

(177)

Sterne 1000 gm.
NaCl 230 "
Sol # 71 65 cc

71 was molded when temperature was about 300.
The ~~was~~ cause Thought which did not entirely cool off.

77

76 molded but mold cooled with wet rag cow being taken to around getting water on cylinder.

11. A blank for the Business machine as made and sold by the National Phonograph Company, and I have marked the same "Defendant's Exhibit Business Phonograph Blank -

78

76 molded [illegible] mold cooled with wet rags allowed motion to get one cylinder -

79

76 Molded one very but shell mold cooled by metal shell no moisture to speak of on the shell -

80 11/20/9

(121)

76 - 100 gm
Tallow. - 10 "

Molded in warm mold, core taken to beef was from water when cooling with wet rag.

81.

same as above except cylinder was allowed to get water on inside

82

Same wax as 80 molded in shell mold with very hot core cooled with heavy shell ice cold no water on cylinder.

#83

Same as 80 colored pink.

#84

Same as 81 colored pink.

#85

Same as 80 marbelized.

#8C 11/25/95

(125)

1000 gm stearic
210 " Na Bz.
70 cc #71 sol.

#71 added while stearic was just melted (about 170 - 175°F) was made slowly.

Did not become so turbid but there was slight turbidity some when first cooled.

The wax came partly crystalline.

The yield of wax was 1025 gm

15 gm $NaBO_3$ added

also colored pink salmon.

Congeal point = 131°C. = 267°F.

2170 gm refined fatty acids –
10 " Iodine

Heated in lead lined sealed iron pipe (5") to 520°F
took about 3 hrs to get to heat
then it was held 1/2 hr &
shut off at noon heat run
up again about 2:30 started
got to 520 at Blower
shut off temperature 490°)
Sample taken showed that
the Iodine had combined with
the lead leaving white iodide of
lead in the stuff.
Fatty acid only slightly hardened –
lead vessel will not work –

520
2:30
2170

88 11/22/9 (129)

Suet tallow melted & mixed with a little benzine this is allowed to get cold & is squeezed in bag the absolute wax melted & cooled off with water to remove the benzine.
Result a much harder substance no marked crystalization
hard enough for 20 lb to the 100. in wax.

23
115

89 11/22/95

Our turbid sitty. (131)

500 gms triple filtered alcohol - minutes turbidity as above.

1.83 / 115 | gms $NaCO_3 + 10 aq$ -

Turned off & observed. Was quite clear after adding the $NaCO_3$ & leaving off. Perhaps slightly more turbid than the alcohol alone.

.5 gm NaHO dissolved filtered & added to the above. Turbidity very perceptibly increased but in good light the bottom of a white dish was visible through the dish full of wine.

I would say that this is less turbid than any of the lots of wine previously made.

2.5 gms stearate of al added. Turbidity very largely increased also in pouring off the clear liquid.

On Turbidity.

100	alumin	× 12	=	1200
23	Na_2CO_3 10aq.	× 12	=	276
.9	Na HO	× 12	=	+10.8
.38	Al (chemically)	× 12	=	4.56
7.02	H_2O (distill)	× 12	=	77.
30	H_2O for the carbonate			

Wax come pretty turbid
Some was filtered through
filter cloth & it came quite clear.

The cause of the turbidity
is, the SiO_2 contained in the
aluminum dissolves in the
hot soda solution & when
the wax is made from this
solution the SiO_2 is precipitated
This is not the case when
the Aluminum is dissolved in
the carbonate of soda solution.
bycinder melted with new mold
with freezing mixture.

91 11/23/45

(120)

Softener:

2240 gm strained tallow here
400 " kerosene mixed with
it while still fluid.

This is allowed to congeal
one night in cool room —
is then pressed in filter
cloth bag under screw press —
yield of hard stearin =
before evaporating 1450 gm.

92

Lifelumen

Some tallow which was melted down & skimmed was pressed cold.

Obtained 455 gms solid
" 232 " oil

The solid was remelted & some gum benzoin added to scent it & a little bit of silicate of lime to change the appearance. it was then skimmed or filtered —

000042

2370 + 2200 = 5170
130 + 200 = 330
120 + 0 = 120
50 + 80 = 130

2370 : 2 = 400 : 9.
40
9470
2000
1470
1200
2700

93

455 gum 490
45 " # 92

94 11/27/95

Oil for molding -

2370 gum 25° Paraffine oil
237 " Stearic oil,
50 " Gum benzoin.
200 " Rosin oil (2nd run)

boiled two thick & refry
Half was poured out & as much
paraffine oil added.
Film cooled & skimmed.

95

Oil for washing

2800 gms paraffin oil

210 " steam. spirit

80 " benzoin

95
7
245

4

1500 | 40
120 | 37.5
300
300
200

96 12/7/95 (143)

Solution

23 Na CO_3 $10H_2O$ × 40 = 920

.9 lb. NaHO, × 40 = 36.

.40 al. #24 shell × 40 = 16.

31 H_2O × 40 = 1400

Divided in 2 parts + the al added to each of 2 qts

#1 Heated all dissolved at 11 cc

#2 Cold " " " ? was all dissolved Monday morning, 9th

#1 solution had only ⅓ so much residue as #2.

Hence the colder the solution while dissolving the better.

Both lots mixed made 1500 cc

Hence 37.5 cc to 100 gm stearin to make wax.

#97 12/10/95 (145)

1600 gms lactofilined stain
600 cc of #96 solution
Yield = 1660 gms.

#98.

Some of the above colored with
a little Saffanine aniline.

2050
2100
1900
4100

15200 : 330 · 6000 : x
6000
1980000 (15200
15600 370
42000
6,600
4100

V. Oil for Melting. 12/12/95 (147)

6000 gm 25° Paraffine oil.
380 Stearic oil
150 Benzoin.
150 2nd sum resin oil
The resin is added after melting of stearin.

000047

Manufacture of Picric Acid.

12/3/91

700 grm. fresh tallow,
42 " cresoline.
56 " NaOH solution 1.352 sp. gr. = 26% NaOH

This lot could be pressed but not very easily.

000048

600 =

27.48
598
21974
24732
19740
114.32916

550 : 600 = 10.16

6000 (52)
550 (1147)
750
550
2250
2100
1500

138
132
132
6

164.05

164.32

171.92

138 : 2 = 172.5 164.5
138
13160
4935
1645
22701.0 | 172
172 | 132.
510
516
341

Testing Carbonate.

200 gms $NaBO_3$ aq sample has been used in experiments.

400 H_2O.

Dissolved in a closed bottle

Gravity by weight + measure = 1128 @ 62°

New lot of $NaBO_3$ aq.

200 gms $NaBO_3$ aq.

400 H_2O.

Gravity by weight + measure = 1105

Lot tested 3/13/96

200 gms $NaBO_3$ aq.

400 H_2O. Sp. Gr. = 1142

made 525 cc.

37.5
14
15.00
.75
6.25.0

#99. 12/16/91

1400 gms Stearic a. from Gross
of 73 Murray St N.Y.
price 8¾ ¢

625 cc #96 Sol.

#100

500 gms of #99
75 " " Oleo stearine

Sterate of Al.

Determination of the Al_2O_3 in the reaction product from Silverlake.

100 gm Sterate gave 11.15 gm Al_2O_3

Manufacture of Fluoric acid. (157) 1/2/96

200 gms distilled bro chromine
13 " NaHO powder -

Tobacco. 1/26/96.
Sunday.

10 5 —

20 gms $KClO_3$
40 cc HCl.
4000 cc H_2O.
Some #35 light color + some
#32 very dark leaf put there in.

#106
40 gms $KClO_3$
80 cc HCl.
4000 cc H_2O
Some #35 light color +
some #32 very dark leaf put
there.

Tobacco 2/2/96

(161)

107

27 gm $KClO_3$ -
54 cc HCl.
1800 cc H_2O.
Some. # 32 + # 35 Tobacco.

108

54 gm $KClO_3$
108 cc HCl.
1800 cc H_2O.
Some #32 + #35 Tobacco

109

108 gm $KClO_3$
216 cc HCl.
1800 cc H_2O.
Some. #32 & #35 Tobacco.

Tobacco 2/2/96

(163)

#110

216. gm. $KClO_3$

400 cc HCl.

800 cc H_2O.

Same #32 & #31 Tobacco.

Testing Wax.

3/17/98

This wax was experimented in moulding by Sinclair commercial method to find the mould.

Congealing point of one of the cylinders = 278° F

Congealing point of the wax from which it was made = 264

2/27/98 (165)

Trouble was experienced at the Phoenix. The wax [illegible] cylinders, only about 25% came OK.

[illegible] left into the wax in the melting [illegible]

Some new [illegible] was 298°. and the congeal [illegible] was 278°. This is higher than should be. It should run [illegible]

3% stearic acid brought the congeal point down to 276

Limit of % stearic acid [illegible] congeal point to

There was no foaming [illegible] the addition of stearic at 320°

17
15
159
16
212
159
12.31

15.50
7.50

11.

87.5
5
49.90

873
45
921

101.62
878
1382
878
5040

1877
11.5

11.5
10.2
1.03

90.00
288
2

921
9

11.50
1.83
16.32
15.97
101.62

flux 700 lbs. @ 9½	=	66.50
$CaCO_3$ 200 " @ .30¢	=	1.83
al 1.9 " @ $2.00	=	3.80
bee. 146 lb. @ 11⅔	=	16.97
365		87.10

Quantities in Number 10.3

" " Old wax 11.5

700 @ 13 —

91.00
1.83
1.50
16.79
111.12 | 12.8
86.5
2462
1730
7320
40

1.9
.20
1.520

146
11½
73
146
146
16.97

91.
1.83
1.50
94.33 | 719
719
2243
2157
860
4
23

29.06
13.1 | 7
203.42
1.9
1.27

203

1

146
11½
230
91
146
146
16.97

1.9 al
2
3.8

700
4
23
146
878

878

89.10 | 878
878 | 10.2
130.0

3/13/45 (173)

600 lb. [illegible]
136 " oxyiodid
2750 lb HO
1090 #1

} as mixture below #4.

~~Sol to be made~~ 3/10/45

600 lb.
135 " $HaBO_3$
2750 lb HO
1035 gm #1
120 lbs. cu.

1800

2000